Listening to Storms and Volcanoes at the Royal Society

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The Observations Research and Development team will be showcasing an interactive exhibit called "Listening to Storms and Volcanoes", highlighting the cutting-edge scientific and technical developments in ground based remote sensing taking place at the Met Office.

The UK radar network comprises of 15 weather radars which scan the atmosphere 24/7, sending out short pulses of electromagnetic waves and listening to the echoes from raindrops. The difference in time between sending the pulse and receiving it locates the rainfall and the strength of the echo determines its intensity.

The latest scientific techniques currently being introduced by the Met Office allow the weather radars to go a step further and detect in what form the water is falling - such as rain, hail, sleet and snow, or collectively known as precipitation. Using dual polarisation technology, which sends and receives a polarised radar beam, they will be able to distinguish between rain, snow and hail by detecting the differences in precipitation shape.

Furthermore, in collaboration with the University of Reading, the Met Office have been developing radar techniques which aim to improve the accuracy of real-time rainfall measurements and also allow the remote observation of humidity using extra information available within radar data.

The new techniques will be of particular use during severe storm events, providing a greater understanding of current and imminent storms.

Adam Curtis, Radar Systems Development Scientist at the Met Office said: "The Met Office radar network provides an invaluable source of data that can be used to both monitor and forecast the weather. By continuing to increase the information produced by our existing radar network, we further support our forecasters to provide weather forecasts and warnings that the public can trust and act upon."

Met Office scientists will also be presenting research linking the amount of lightning produced near a volcano to the ash plume height, providing a method of rapidly alerting forecasters to potential increases in eruptive activity of volcanoes around the world.

The Met Office's recently enhanced long-range lightning-location network (ATDnet) was used to assess the number of lightning strokes produced during the explosive eruption of the Eyjafjallajökull volcano in Iceland in 2010 and was found to be approximately proportional to the ash plume height.

Such a finding is useful because volcanoes in many parts of the world are not conveniently located next to radar systems. As such, early identification of volcanic plumes and real-time monitoring of plume heights above remote volcanoes could be achieved by combining long-range lightning location networks such as ATDnet with other remote measurements such as seismic activity and satellite-based observations.

Malcolm Kitchen, Observations Research and Development Manager at the Met Office said: "ATDnet is used to monitor thunderstorms over a vast area of the world extending from the US to China and the Arctic to the South Atlantic, centred over the UK. This new technique could ultimately be used to monitor volcanoes in remote locations."

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Last updated: 3 July 2012